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Docket No.: 050212-0191

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Customer Number: 20277
Toshiaki OKUNO, et al.	:	Confirmation Number: 2297
Application No.: 09/781,564	:	Group Art Unit: 2638
Filed: February 13, 2001	:	Examiner: Dzung D. Tran

For: OPTICAL TRANSMISSION SYSTEM AND METHOD

REPLY BRIEF

Mail Stop Reply Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is submitted in response to the Examiner's Answer dated June 15, 2005.

ARGUMENT

It is initially noted that at page two of the Examiner's Answer, the Examiner incorrectly asserted that Appellant's Brief did not contain a statement regarding related appeals and interferences. Appellant's Brief, at page 1, includes a statement indicating that Appellant is unaware of any related Appeal or Interference.

In addtion, beginning on page 4 of the present Reply Brief, Appellant is including a revised Summary of Invention section to include reference to the specification by page and line number and to the drawings by reference character. Appellant respectfully requests that the revised Summary of Invention replace the previous summary contained in Appellant's Brief submitted on February 8, 2005.

Appellant respectively solicits the Honorable Board to reverse each of the Examiner's rejections for the reasons argued in the February 8, 2005 Appeal Brief, and for the reasons set forth *infra*.

At page 4-5 of the Examiner's Answer, the Examiner concluded that one of ordinary skill in the art would have been motivated to modify the optical fiber transmission system of Mitsuda by having a first signal wavelength at the first multiplexing section that has a lower noise figure than the second signal wavelength at the second multiplexing section because "Ogashi suggests that this is advantageous in maintaining the optical power output."

Appellant stresses that the requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 requires not only a suggestion but a reasonable expectation of success as to a particular benefit. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Obvious to try is not the standard. *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed.

Cir. 1988); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988). As the Examiner has not established that the prior art teaches, with a reasonable expectation of success, that a particular benefit would result from the Examiner's proposed combination, Applicants respectfully submit that one having ordinary skill in the art would not have been motivated to modify Mitsuda's system in view of Ogashi. Indeed, the Examiner has not made the requisite "clear and particular" factual findings as to any specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify Mitsuda with Ogashi the to arrive at the claimed inventions. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.*, 222 F.2d 973, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzaab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.2d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). The only apparent motivation is found in Appellant's disclosure, which, of course, can not be properly relied upon by the Examiner to support the legal conclusion of obviousness under 35 U.S.C. § 103. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985).

For the reasons set forth in the February 8, 2005 Appeal Brief, and for the reasons expressed herein, Appellants respectfully solicit the Honorable Board to reverse each of the Examiner's rejections.

SUMMARY OF INVENTION

As discussed at page 2, lines 15-21 of the Summary of the Invention section of the present specification, a conventional multi-drop system, known as wavelength division multiplexing optical transmission system, is a system in which a plurality of signal light components having wavelengths different from each other are transmitted through a single optical transmission line while successively being multiplexed or demultiplexed at respective signal multiplexing or demultiplexing sections. In instances where an optical amplifier is installed on the optical transmission line of such a multi-drop type wavelength division multiplexing transmission system, a plurality of signal multiplexing sections are installed in the optical transmission line connected to the input side of the optical amplifier, whereby multiple-wavelength light including signal light components having wavelengths different from each other multiplexed at the individual signal multiplexing sections is amplified by the optical amplifier (page 2, line 25 through page 3 line 8 of the written description of the specification). Here, the attenuation of signal light caused by optical transmission depends on the transmission length, whereas the respective transmission lengths by which the signal light components multiplexed at their corresponding signal multiplexing sections are transmitted until they are fed into the optical amplifier vary depending on the positions where the signal multiplexing sections are installed (page 3, lines 8-13 of the written description of the specification). As a consequence, the S/N ratio of signal light in the output of optical amplifier may vary among the individual signal light components (page 3 lines 14-17 of the written description of the specification).

The present invention addresses and solves problems and difficulties of the prior art by providing an optical transmission system (independent claims 1, 6 and 11) and method

(independent claims 16, 17 and 18) in which fluctuations in S/N ratio among signal light components of multiple-wavelength signal light amplified by an optical amplifier on an optical transmission line are reduced (page 3 lines 18-23 of the written description of the specification).

According to one aspect of the present subject matter, as described in independent claim 1 and depicted in FIG. 1, an optical transmission system is provided which comprises (1) an optical transmission line **1** through which a plurality of signal light components having wavelengths different from each other included in a predetermined wavelength band are transmitted; (2) an optical amplifier **2**, installed on the optical transmission line, having a wavelength-dependent noise figure; and (3) a plurality of multiplexing stations **3, 4, 5** each constituted by a signal multiplexing section **31, 41, 51** installed on the optical transmission line connected to an input end side of the optical amplifier, and at least one signal light outputting means **30, 40, 50** for outputting a signal light component multiplexed at the signal multiplexing section; wherein (4), between two of the multiplexing stations adjacent each other, the signal light outputting means of the multiplexing station disposed upstream in a signal light propagating direction outputs a signal light component λ_1, λ_2, λ_3 having a signal wavelength set so as to yield a noise figure lower than that of the signal wavelength of a signal light component outputted from the signal light outputting means of the multiplexing station disposed downstream.

Independent claim 6 describes an optical transmission system comprising (1) an optical transmission line **1** through which a plurality of signal light components having wavelengths different from each other included in a predetermined wavelength band are transmitted; (2) a plurality of optical amplifiers **2a, 2b** (FIG. 4) installed on the optical transmission line, each having a wavelength-dependent noise figure; (3) a first multiplexing station having a first signal multiplexing section installed upstream from the plurality of optical amplifiers in a signal light

propagating direction and a first signal light outputting means for outputting a first signal light component multiplexed at the first signal multiplexing section; (4) a second multiplexing station having a second signal multiplexing section installed between the plurality of optical amplifiers, and a second signal light outputting means for outputting a second signal light component multiplexed at the second signal multiplexing section; and a receiving station **11**, installed downstream of the plurality of optical amplifiers, for receiving the first signal light component having a first signal wavelength multiplexed at the first signal multiplexing section and the second signal light component having a second signal wavelength multiplexed at the second signal multiplexing section. The first signal light outputting means outputs the first signal light component having the first signal wavelength set such that the noise figure between the first signal multiplexing section and the receiving station is lower than that of the second signal wavelength.

Independent claim 11 is substantially the same as independent claim 6, but for the second multiplexing station. The second multiplexing station in claim 11 has a second signal multiplexing section installed between the plurality of optical amplifiers or installed upstream the plurality of optical amplifiers but downstream the first signal multiplexing section, and second signal light outputting means for outputting a second signal light component multiplexed at the second signal multiplexing section.

Also, as described in independent claim 16, the present invention provides an optical transmission method applied to an optical transmission system comprising: (1) an optical transmission line **1** through which a plurality of signal light components having wavelengths different from each other included in a predetermined wavelength band are transmitted; (2) an optical amplifier **2**, installed on the optical transmission line, having a wavelength-dependent

noise figure; and (3) a plurality of signal multiplexing sections **3, 4, 5** installed on the optical transmission line connected to an input end side of the optical amplifier; wherein (4), between two of the signal multiplexing sections adjacent each other, a signal light component **30, 40, 50** having a signal wavelength with a noise figure lower than that of the signal wavelength of a signal light component multiplexed at the signal multiplexing section disposed downstream in a signal light propagating direction is selectively assigned as a signal light component multiplexed at the signal multiplexing section disposed upstream.

The present subject matter, as described in independent claim 17, provides for an optical transmission method applied to an optical transmission system which comprises: (1) an optical transmission line **1** through which a plurality of signal light components having wavelengths different from each other included in a predetermined wavelength band are transmitted; (2) a plurality of optical amplifiers **2a, 2b**, installed on the optical transmission line, each having a wavelength-dependent noise figure; (3) a first signal multiplexing section, installed upstream the plurality of optical amplifiers in a signal light propagating direction, for multiplexing a first signal light component; (4) a second signal multiplexing section, installed between the plurality of optical amplifiers or installed upstream the plurality of optical amplifiers but downstream the first signal multiplexing section, for multiplexing a second signal light component; and (5) a receiving station **11**, installed downstream the plurality of optical amplifiers, for receiving the first signal light component having a first signal wavelength multiplexed at the first signal multiplexing section and the second signal light component having a second signal wavelength multiplexed at the second signal multiplexing section; wherein (6) the first signal light component having the first signal wavelength whose noise figure between the first signal multiplexing section and the receiving station is lower than that of the second signal wavelength

is selectively assigned as the signal light component multiplexed at the first signal multiplexing section.

Independent method claim 18 is substantially the same as independent claim 17, but for the second multiplexing station. In claim 18, a second signal multiplexing section is installed upstream of the plurality of optical amplifiers but downstream of the first signal multiplexing section, for guiding a second signal light component into the optical transmission line.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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